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Approved for use through 09/30/2000, OMB 0651-0032
Patent and Trademark Office U.S. DEPARTMENT OF COMMERCE

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UTILITY PATENT APPLICATION TRANSMITTAL		Attorney Docket No	61311008
		First Inventor or Application Identifier	Andrews, Greg
		Title	Anti-Icing Formulations
(Only for new nonprovisional applications under 37 CFR 1.53(b))		Express Mail Label No.	EK599480649US

JC74 U.S. PRO+
09/661702

09/14/00

APPLICATION ELEMENTS See MPEP chapter 600 concerning utility patent application contents		ADDRESS TO: Assistant Commissioner for Patents Box Patent Application Washington, DC 20231	
<p>1. <input checked="" type="checkbox"/> * Fee Transmittal Form (e.g., PTO/SB/17) (Submit an original, and a duplicate for fee processing)</p> <p>2. <input checked="" type="checkbox"/> Specification [Total Pages 22] (preferred arrangement set forth below)</p> <ul style="list-style-type: none"> - Descriptive title of the Invention - Cross References to Related Applications - Statement Regarding Fed sponsored R & D - Reference to Microfiche Appendix - Background of the Invention - Brief Summary of the Invention - Brief Description of the Drawings (if filed) - Detailed Description - Claim(s) - Abstract of the Disclosure <p>3. <input type="checkbox"/> Drawing(s) (35 U.S.C. 113) [Total Sheets]</p> <p>4. Oath or Declaration [Total Pages]</p> <ul style="list-style-type: none"> a. <input checked="" type="checkbox"/> Newly executed (original or copy) b. <input type="checkbox"/> Copy from a prior application (37 C.F.R. § 1.63(d)) (for continuation/divisional with Box 17 completed) <i>[Note Box 5 below]</i> <ul style="list-style-type: none"> i. <input type="checkbox"/> DELETION OF INVENTOR(S) Signed statement attached deleting inventor(s) named in the prior application, see 37 C.F.R. §§ 1.63(d)(2) and 1.33(b). <p>5. <input type="checkbox"/> Incorporation By Reference (useable if Box 4b is checked) The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Box 4b, is considered to be part of the disclosure of the accompanying application and is hereby incorporated by reference therein.</p>		<p>6. <input type="checkbox"/> Microfiche Computer Program (Appendix)</p> <p>7. Nucleotide and/or Amino Acid Sequence Submission (if applicable, all necessary)</p> <ul style="list-style-type: none"> a. <input type="checkbox"/> Computer Readable Copy b. <input type="checkbox"/> Paper Copy (identical to computer copy) c. <input type="checkbox"/> Statement verifying identity of above copies 	
ACCOMPANYING APPLICATION PARTS <ul style="list-style-type: none"> 8. <input type="checkbox"/> Assignment Papers (cover sheet & document(s)) 9. <input type="checkbox"/> 37 C.F.R. § 3.73(b) Statement <input type="checkbox"/> Power of Attorney (when there is an assignee) 10. <input type="checkbox"/> English Translation Document (if applicable) 11. <input type="checkbox"/> Information Disclosure Statement (IDS)/PTO-1449 <input type="checkbox"/> Copies of IDS Citations 12. <input type="checkbox"/> Preliminary Amendment 13. <input checked="" type="checkbox"/> Return Receipt Postcard (MPEP 503) <i>(Should be specifically itemized)</i> 14. <input checked="" type="checkbox"/> Small Entity Statement(s) <input type="checkbox"/> Statement filed in prior application, (PTO/SB/09-12) <input type="checkbox"/> Status still proper and desired 15. <input type="checkbox"/> Certified Copy of Priority Document(s) (if foreign priority is claimed) 16. <input checked="" type="checkbox"/> Other: Credit Card Payment Form <p>* A new statement is required to be entitled to pay small entity fees, except where one has been filed in a prior application and is being relied upon</p>			

17. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in a preliminary amendment

 Continuation Divisional Continuation-in-part (CIP) of prior application No. _____ / _____

Prior application information: Examiner _____ Group / Art Unit: _____

18. CORRESPONDENCE ADDRESS					
<input type="checkbox"/> Customer Number or Bar Code Label <small>(Insert Customer No. or Attach bar code label here)</small>		or <input checked="" type="checkbox"/> Correspondence address below			
Name	Barry E. Kaplan, Esq. Hughes & Kaplan				
Address	2415 West Park Place Boulevard Suite B				
City	Stone Mountain	State	Georgia	Zip Code	30087
Country	United States	Telephone	770-469-8887	Fax	770-469-9099

Name (Print/Type)	Barry E. Kaplan	Registration No (Attorney/Agent)	38,934
Signature	Barry E. Kaplan	Date	09/14/2000

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ORIGINAL

PTO/SB/17 (1/98)

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FEE TRANSMITTAL

Patent fees are subject to annual revision on October 1.

These are the fees effective October 1, 1997.

Small Entity payments must be supported by a small entity statement, otherwise large entity fees must be paid. See Forms PTO/SB/09-12

TOTAL AMOUNT OF PAYMENT (\$ 384.00)

Complete if Known

Application Number	
Filing Date	SEPTEMBER 14, 2000
First Named Inventor	Andrews, Greg
Examiner Name	
Group / Art Unit	
Attorney Docket No.	61311008



METHOD OF PAYMENT (check one)				FEE CALCULATION (continued)																																																																																																																																			
<p>1. <input type="checkbox"/> The Commissioner is hereby authorized to charge indicated fees and credit any over payments to Deposit Account Number _____ Deposit Account Name _____</p> <p><input type="checkbox"/> Charge Any Additional Fee Required Under 37 CFR 1.16 and 1.17 <input type="checkbox"/> Charge the Issue Fee Set in 37 CFR 1.18 at the Mailing of the Notice of Allowance</p>				<p>3. ADDITIONAL FEES</p> <table border="1"> <thead> <tr> <th>Large Entity Fee Code (\$)</th> <th>Small Entity Fee Code (\$)</th> <th>Fee Description</th> <th>Fee Paid</th> </tr> </thead> <tbody> <tr><td>105</td><td>130</td><td>205 Surcharge - late filing fee or oath</td><td></td></tr> <tr><td>127</td><td>50</td><td>227 Surcharge - late provisional filing fee or cover sheet</td><td></td></tr> <tr><td>139</td><td>130</td><td>139 Non-English specification</td><td></td></tr> <tr><td>147</td><td>2,520</td><td>147 2,520 For filing a request for reexamination</td><td></td></tr> <tr><td>112</td><td>920*</td><td>112 920* Requesting publication of SIR prior to Examiner action</td><td></td></tr> <tr><td>113</td><td>1,840*</td><td>113 1,840* Requesting publication of SIR after Examiner action</td><td></td></tr> <tr><td>115</td><td>110</td><td>215 Extension for reply within first month</td><td></td></tr> <tr><td>116</td><td>400</td><td>216 Extension for reply within second month</td><td></td></tr> <tr><td>117</td><td>950</td><td>217 Extension for reply within third month</td><td></td></tr> <tr><td>118</td><td>1,510</td><td>218 Extension for reply within fourth month</td><td></td></tr> <tr><td>128</td><td>2,060</td><td>228 Extension for reply within fifth month</td><td></td></tr> <tr><td>119</td><td>310</td><td>219 Notice of Appeal</td><td></td></tr> <tr><td>120</td><td>310</td><td>220 Filing a brief in support of an appeal</td><td></td></tr> <tr><td>121</td><td>270</td><td>221 Request for oral hearing</td><td></td></tr> <tr><td>138</td><td>1,510</td><td>138 Petition to institute a public use proceeding</td><td></td></tr> <tr><td>140</td><td>110</td><td>240 Petition to revive - unavoidable</td><td></td></tr> <tr><td>141</td><td>1,320</td><td>241 Petition to revive - unintentional</td><td></td></tr> <tr><td>142</td><td>1,320</td><td>242 Utility issue fee (or reissue)</td><td></td></tr> <tr><td>143</td><td>450</td><td>243 Design issue fee</td><td></td></tr> <tr><td>144</td><td>670</td><td>244 Plant issue fee</td><td></td></tr> <tr><td>122</td><td>130</td><td>122 Petitions to the Commissioner</td><td></td></tr> <tr><td>123</td><td>50</td><td>123 Petitions related to provisional applications</td><td></td></tr> <tr><td>126</td><td>240</td><td>126 Submission of Information Disclosure Stmt</td><td></td></tr> <tr><td>581</td><td>40</td><td>581 Recording each patent assignment per property (times number of properties)</td><td></td></tr> <tr><td>146</td><td>790</td><td>246 Filing a submission after final rejection (37 CFR 1.129(a))</td><td></td></tr> <tr><td>149</td><td>790</td><td>249 For each additional invention to be examined (37 CFR 1.129(b))</td><td></td></tr> <tr><td colspan="4">Other fee (specify) _____</td></tr> <tr><td colspan="4">Other fee (specify) _____</td></tr> <tr> <td colspan="4">SUBTOTAL (1) (\$ 345)</td> <td colspan="4">SUBTOTAL (3) (\$ 0.)</td> </tr> <tr> <td colspan="4">Reduced by Basic Filing Fee Paid</td> </tr> </tbody> </table>				Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description	Fee Paid	105	130	205 Surcharge - late filing fee or oath		127	50	227 Surcharge - late provisional filing fee or cover sheet		139	130	139 Non-English specification		147	2,520	147 2,520 For filing a request for reexamination		112	920*	112 920* Requesting publication of SIR prior to Examiner action		113	1,840*	113 1,840* Requesting publication of SIR after Examiner action		115	110	215 Extension for reply within first month		116	400	216 Extension for reply within second month		117	950	217 Extension for reply within third month		118	1,510	218 Extension for reply within fourth month		128	2,060	228 Extension for reply within fifth month		119	310	219 Notice of Appeal		120	310	220 Filing a brief in support of an appeal		121	270	221 Request for oral hearing		138	1,510	138 Petition to institute a public use proceeding		140	110	240 Petition to revive - unavoidable		141	1,320	241 Petition to revive - unintentional		142	1,320	242 Utility issue fee (or reissue)		143	450	243 Design issue fee		144	670	244 Plant issue fee		122	130	122 Petitions to the Commissioner		123	50	123 Petitions related to provisional applications		126	240	126 Submission of Information Disclosure Stmt		581	40	581 Recording each patent assignment per property (times number of properties)		146	790	246 Filing a submission after final rejection (37 CFR 1.129(a))		149	790	249 For each additional invention to be examined (37 CFR 1.129(b))		Other fee (specify) _____				Other fee (specify) _____				SUBTOTAL (1) (\$ 345)				SUBTOTAL (3) (\$ 0.)				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SUBMITTED BY

Typed or Printed Name	Barry E. Kaplan, Esq.			Complete (if applicable)
Signature				Reg. Number 38,934
Date	09/14/00	Deposit Account User ID		

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PTO/SB/09 (10-96)

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**VERIFIED STATEMENT CLAIMING SMALL ENTITY STATUS
(37 CFR 1.9(f) & 1.27(b))—INDEPENDENT INVENTOR**Docket Number (Optional)
61311008Applicant or Patentee: Greg R. Andrews; Robert S. Mendenhall

Application or Patent No.: _____

Filed or Issued: September 14, 2000Title: Anti-Icing Formulations

As a below named inventor, I hereby declare that I qualify as an independent inventor as defined in 37 CFR 1.9(c) for purposes of paying reduced fees to the Patent and Trademark Office described in:

- the specification filed herewith with title as listed above.
 the application identified above.
 the patent identified above.

I have not assigned, granted, conveyed, or licensed, and am under no obligation under contract or law to assign, grant, convey, or license, any rights in the invention to any person who would not qualify as an independent inventor under 37 CFR 1.9(c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e).

Each person, concern, or organization to which I have assigned, granted, conveyed, or licensed or am under an obligation under contract or law to assign, grant, convey, or license any rights in the invention is listed below:

- No such person, concern, or organization exists.
 Each such person, concern, or organization is listed below.

Separate verified statements are required from each named person, concern, or organization having rights to the invention averring to their status as small entities (37 CFR 1.27)

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

Greg R. Andrews

NAME OF INVENTOR

Signature of Inventor

9/14/00

Date

Robert S. Mendenhall

NAME OF INVENTOR

Signature of Inventor

9/14/2000

Date

NAME OF INVENTOR

Signature of Inventor

Date

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61311008.010

5

APPLICATION FOR LETTERS PATENT
UNITED STATES OF AMERICA

10

Be it known that I, **Greg R. Andrews**, residing at 70
15 Home Avenue, Second Floor, Middletown, Connecticut, 06457,
and I, **Robert S. Mendenhall**, residing at 9 Brainerd Avenue,
Middletown, Connecticut, 06457, both being citizens of the
United States of America, have invented certain new and
useful improvements in

20

ANTI-ICING FORMULATIONS

25

of which the following is a specification.

30

INVENTOR'S REPRESENTATIVE:

35

Barry E. Kaplan, Esq.
The Law Firm of HUGHES & KAPLAN
2415 West Park Place Boulevard
Suite B
Stone Mountain, Georgia 30087
(770) 469-8887 - Voice
(770) 469-9099 - Facsimile
barry_kaplan@msn.com - email

40

TITLE:

ANTI-ICING FORMULATIONS

5

RELATED APPLICATIONS:

This non-provisional application claims the benefit of
Provisional Application Serial No. 60/154,706, filed on
September 18, 1999.

10
15
20TECHNICAL FIELD

The present invention relates generally to anti-icing formulations; and, more specifically, to anti-icing and de-icing formulations produced from alcohol/polyol-based aqueous fluids, thickened by the combination of an acrylic emulsion and a water-swellable layered clay mineral. Optional formulations include the addition of a surfactant combination comprised of a first surfactant with an hydrophilic/ lipophilic balance ("HLB") ≤ 3 , coupled with a second surfactant with an HLB 19, and include the further optional addition of a water-activated polymer and other components. A second basic formulation describes a polyol-

based aqueous solution of polyvinyl alcohol with optional thickeners.

BACKGROUND OF THE INVENTION:

5 The problem of ice formation on surfaces is well known, and is addressed extensively in the prior art. There is still a need, however, for deicing/ anti-icing compositions which offer enhanced resistance to rain wash-off. Furthermore, there exists a need for effective deicing/ 10 anti-icing compositions which may be applied using simple light-duty hand-held sprayers.

Accordingly, it is an object of the present invention to provide a first form of anti-icing compositions which are easily removable from surfaces to which they are applied, 15 and contain no polyvinyl alcohol, and to provide a second form that will set-up to form a rubber-like gel within several hours after mixing.

It is another object of the present invention to provide anti-icing compositions principally comprising an 20 aqueous solution of monohydroxy and/ or polyhydroxy alcohols, thickened with a combination of an acrylic emulsion polymer and a water-swellable, colloid-forming clay mineral.

It is still another object of the present invention to provide anti-icing compositions compatible with optional ingredients such as polyols, surfactants, pH-modifiers, friction-reducing agents, corrosion inhibiting agents, anti-
5 oxidants, UV inhibitors, biocides, dyes, foam control agents, odor-modification agents, stabilizers, and the like.

It is yet another object of the present invention to provide anti-icing compositions that utilize non-toxic chemicals as freezing point depressants.

It is yet still another object of the present invention to provide anti-icing compositions having viscosity that may be adjusted for application of the composition through a variety of means.

15 BRIEF SUMMARY OF THE INVENTION:

The present invention provides substantial improvement to the art for a variety of applications. Formulations are described for compositions which may be applied using light-duty sprayers, yet still allow for higher viscosities, and,
20 thereby, greater resistance to rain wash-off, than analogous prior-art formulations. Formulations are also described which provide enhanced resistance to water incursion. Formulations are further described for compositions

providing such an extreme level of resistance to wash-off that they are only suitable for applications where easy removal of the composition is not an issue.

Accordingly, anti-icing compositions are disclosed
5 comprising an aqueous solution of monohydroxy and/or polyhydroxy alcohols, thickened with a combination of an acrylic emulsion polymer and a water-swellable, colloid-forming clay mineral. Optional additions include glycerine, and added surfactant combinations comprised of a first
10 surfactant with an hydrophilic/ lipophilic balance \leq 3 coupled with a second surfactant with an HLB 19. An example of such surfactant combination is a block copolymer of ethylene-oxide and propylene-oxide.

Further optional additions may include Teflon powder,
15 graphite, pH-modifiers, corrosion inhibiting agents, anti-oxidants, UV inhibitors, biocides, dyes, foam control agents, odor-modification agents, stabilizers, and the like. Advantageously, the preferred formulations of the present invention utilize non-toxic chemicals as freezing point
20 depressants.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT:

In describing the preferred and alternate embodiments of the present invention, specific terminology is employed for the sake of clarity. The invention, however, is not intended to be limited to the specific terminology so selected, and it is to be understood that each specific element includes all technical equivalents that operate in a similar manner to accomplish similar functions.

The present invention consists of formulations for anti-icing fluids. These fluids also have utility for deicing applications. The present formulations are of two basic types, which are most simply distinguished by the presence or lack of polyvinyl alcohol.

15 Type I Formulations:

The formulations of the first basic type are designed to be easily removable from surfaces to which they are applied, and contain no polyvinyl alcohol. These formulations are comprised of combinations of the following components:

A. Freezing point depressant: This component will typically comprise between 20 to 80 weight percent of the total composition. The following are preferred:

a) One, two, or three carbon alcohols (i.e., methyl, ethyl, and propyl alcohols). These alcohols provide economy, low viscosity, rapid evaporation, and are quite flammable.

5 b) Two or three carbon glycols (i.e., ethylene glycol or propylene glycol). These diols are viscous, odorless, slow evaporating, and non-flammable.

c) Glycerol (1,2,3-propanetriol). Glycerol (Glycerine) is very viscous, odorless, extremely slow evaporating, and non-flammable. (For maximum viscosity and water resistance, these compositions should contain at least approximately 5% by weight glycerine).

d) Any combination of the above. The above components blend easily to yield compositions with a combination of the above- mentioned properties.

B. Water: This component will typically comprise between 20 to 80 weight percent of the total composition. The water does not have to be distilled or purified, although hard water may require pre-treatment or the addition of a sequestrant.

C. Acrylic-based emulsion polymer or copolymer: This component will typically comprise between 0.1 to 15 weight

percent of the total composition. Most preferred are associative, hydrophobically modified polymer emulsions.

D. Colloid-forming (water swellable) layered clay mineral: This component will typically comprise between 5 0.05 to 5 weight percent, and most typically between 0.1 to 2 weight percent of the total composition. Preferred are natural or synthetic hectorites, montmorillonites and bentonites, and of these, purified or synthetic hectorites are especially preferred.

E. Nonionic surfactant with an HLB in the range of 10 to 3: This component is optional, and will typically comprise between 0.1 to 3 weight percent, and most typically between 0.5 to 2.0 weight percent of the total composition.

F. Nonionic surfactant with an HLB of 19 or above: 15 This component is optional, and will typically comprise between 0.01 to 1.0 weight percent, and most typically between 0.05 to 0.5 weight percent of the total composition.

G. Polymeric water-activated thickening agent: This component is optional, and will typically comprise between 20 0.01 to 10.0 weight percent, and most typically between 0.1 to 5.0 weight percent of the total composition. Preferred are polysaccharide thickeners, natural gum thickeners, marine algae colloids, and cellulose ether thickeners. Most

preferred is a polysaccharide known generically as Xanthan Gum.

H. pH adjusting agent: This component will typically comprise less than 0.5 weight percent of the total composition, and is, in any case, only required in an amount sufficient to adjust the pH upward to the range between 6 to 12, most preferably to between 7.5 to 10. Preferred are alkaline metal hydroxides and organic amine bases, although it may be advisable to avoid the use of tertiary amines as these can possibly interfere with the gel structure of these formulations.

I. Corrosion Inhibitors: These components are optional, and will typically comprise less than 1 weight percent of the total composition. Corrosion inhibitors useful as ingredients in alcohol/polyol based aqueous solutions are well known in the art, and selection may be made based upon the type of surfaces with which the present compositions are likely to come into contact, and how long and under what conditions they are likely to remain on that surface.

J. Powder lubricant: This component is optional, and is only used in compositions which are designed for applications such as locks or hinges, where it may be useful

to supplement the anti-icing function with one of lubrication. Preferred are graphite or Teflon powders, and the amounts will typically comprise between 0.1 to 10 weight percent of the total composition.

5 K. Miscellaneous additives: The composition may also contain various other functional ingredients such as anti-oxidants, UV inhibitors, biocides, dyes, foam control agents, odor-modification agents, stabilizers and the like. Each of these components will typically comprise less than
10 1.0 weight percent of the total composition.

Examples of Type I Formulations:

Some examples of compositions produced by the aforementioned first basic type formulations are as follows,
15 with the ingredients listed in approximate order of addition:

i. Slow-evaporating, non-toxic, viscous, thixotropic anti-icing fluid for application by trigger-type or other light-duty sprayers.

40 wt. %	Water
0.25 wt. %	LAPONITE® (synthetic hectorite clay: Laporte Industries, Ltd.)

0.75 wt. %	ALCOGUM® SL-70 (acrylic emulsion terpolymer: ALCO Chemical)
0.1 wt. %	PLURONIC® F108 (nonionic surfactant: BASF)
23 wt. %	Glycerine
20 wt. %	Propylene glycol
≈ 0.1 wt. %	AMP-95 (Aminomethyl propanol: Angus Chemical Co.)
15 wt. %	Isopropyl Alcohol
0.5 wt. %	PLURONIC® 31R1 (nonionic surfactant: BASF)
0.4 wt. %	Orange Oil 5 Fold (Frutarom-Meer Corporation)

ii. Viscous, thixotropic anti-icing fluid for use in automobile windshield washer reservoirs:

48.5 wt. %	Water
0.25 wt. %	LAPONITE® (synthetic hectorite clay: Laporte Industries, Ltd.)
0.5 wt. %	ALCOGUM® SL-70 (acrylic emulsion terpolymer: ALCO Chemical) Note: This ingredient is optional for windshield washer reservoir fluid.
0.05 wt. %	PLURONIC® F108 (nonionic surfactant: BASF)
15 wt. %	Ethylene glycol (substitute propylene glycol to produce a non-toxic product)
≈ 0.1 wt. %	AMP-95 (Aminomethyl propanol: Angus Chemical

	Co.)
35 wt. %	Methanol (substitute isopropyl alcohol to produce a non-toxic product)
0.5 wt. %	PLURONIC® 31R1 (nonionic surfactant: BASF)
0.3 wt. %	Orange Oil 5 Fold (Frutarom-Meer Corporation) (Use when isopropyl alcohol is an ingredient.)

iii. Highly water-resistant, low-evaporation, non-toxic, anti-icing gels for application by hand-held spreaders or heavy-duty sprayers:

36 wt. %	Water
0.5 wt. %	LAPONITE® (synthetic hectorite clay: Laporte Industries, Ltd.)
10 wt. %	ALCOGUM® SL-70 (acrylic emulsion terpolymer: ALCO Chemical)
0.12 wt. %	PLURONIC® F108 (nonionic surfactant: BASF)
10 wt. %	Glycerine
42 wt. %	Propylene glycol
0.4 wt. %	KELZAN® (xanthan gum: Kelco Industrial Biopolymers)
1.2 wt. %	PLURONIC® 31R1 (nonionic surfactant: BASF)
≈ 0.2 wt. %	AMP-95 (Aminomethyl propanol: Angus Chemical

	Co.)
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iv. Low-evaporation, non-toxic, highly viscous anti-icing gel with lubricant; for application by injection into all types of locks:

35 wt. %	Water
1.0 wt. %	LAPONITE® (synthetic hectorite clay: Laporte Industries, Ltd.)
2.0 wt. %	ALCOGUM® SL-70 (acrylic emulsion terpolymer: ALCO Chemical)
0.15 wt. %	PLURONIC® F108 (nonionic surfactant: BASF)
40.0 wt. %	Glycerine
20 wt. %	Propylene glycol
0.5 wt. %	Zonyl® MP 1000 (PTFE powder: DuPont)
0.5 wt. %	KELZAN® (xanthan gum: Kelco Industrial Biopolymers)
0.7 wt. %	PLURONIC® 31R1 (nonionic surfactant: BASF)
≈ 0.2 wt. %	AMP-95 (Aminomethyl propanol: Angus Chemical Co.)

Type II Formulations:

The formulations of the second basic type contain polyvinyl alcohol, and are designed to be extremely water resistant. These formulations are comprised of the 5 following components:

A. Freezing point depressant: This component will typically comprise between 30 to 70 weight percent of the total composition. The following are preferred:

- a) Two or three carbon glycols.
- b) Glycerol (Glycerine, 1,2,3-propanetriol).
- c) A combination of the above.

B. Water: This component will typically comprise between 30 to 70 weight percent of the total composition. The water does not have to be distilled or purified, although hard water may require pre-treatment or the 15 addition of a sequestrant.

C. Polyvinyl alcohol: This component will typically comprise between 2 to 15 weight percent, and most typically between 6 to 10 weight percent, of the total composition.

20 Fully-hydrolyzed, gel-resistant grades are most preferred.

D. Acrylic-based emulsion polymer or copolymer, or a crosslinked homopolymers or copolymers of acrylic acid: This component is optional, and will typically comprise

between 0.1 to 10 weight percent of the total composition.

Most preferred are hydrophobically-modified compounds.

E. Polymeric water-activated thickening agent: This component is optional, and will typically comprise between 5 0.1 and 10.0 weight percent of the total composition.

Preferred are polysaccharide thickeners, natural gum thickeners, marine algae colloids, and cellulose ether thickeners. Most preferred is a polysaccharide known generically as Xanthan Gum.

F. Hydrogen peroxide: This component is optional, and will typically comprise between 0.02 and 1.5 weight percent of the total composition. This ingredient serves to lower the viscosity of polyvinyl alcohol solutions.

G. pH adjusting agent: This component will typically comprise less than 0.5 weight percent of the total composition, and is, in any case, only required in an amount sufficient to adjust the pH upward to the range between 7 and 12, most preferably to between 7.5 and 10. Strong bases, such as alkaline metal hydroxides can cause damage to 20 the polyvinyl alcohol. Preferred are organic amine bases or ammonium hydroxide.

H. Corrosion inhibitors: These components are optional, and will typically comprise less than 1 weight

percent of the total composition. Corrosion inhibitors useful for use in polyol based aqueous solutions are well known in the art, and selection may be made based upon the type of surfaces which the present compositions are likely 5 to come in contact with, and how long and under what conditions they are likely to remain on that surface.

I. Miscellaneous additives: The composition may also contain various other functional ingredients such as surfactants, anti-foaming agent, anti-oxidants, UV 10 inhibitors, biocides, dyes, odor-modification agents, stabilizers and the like. Each of these components will typically comprise less than 1.0 weight percent of the total composition.

15 Examples of Type II Formulations:

Compositions produced by the aforementioned second basic formulation will set-up to form a rubber-like gel within several hours after mixing. Typically, therefore, these compositions will be made in two or more parts, which 20 are then mixed together prior to use. An example is shown below of a three part formulation. Parts A and B are volumetrically approximately equal parts, with the ingredients listed in order of addition:

PART A:

82 wt. %	Water
0.5 wt. %	Hydrogen peroxide
0.07 wt. %	TRITON® X-100 (gel-inhibiting surfactant: Union Carbide)
17 wt. %	ELVANOL® 85-82 (polyvinyl alcohol: DuPont)
≈ 0.2 wt. %	Triethanolamine (sufficient to produce a pH of about 7-10 for the combined parts)

PART B:

99.3 wt. %	Glycerine
0.5 wt. %	Carbopol® ETD 2623 (polyacrylic acid carbomer: B.F. Goodrich)
≈ 0.2 wt. %	DREWPLUS® L-474 (foam control agent: Drew Industrial Div., Ashland Chemical)
≈ 0.02 wt. %	Any color dye to indicate whether Parts "A" and "B" are fully mixed

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PART C:

≈ 1 % by weight	KELZAN® (xanthan gum: Kelco Industrial
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Mixing Instructions for the above-described multi-part formulation:

Disperse part "C" into part "B". While stirring part
5 "A", add the "B/C" mix to part "A" and mix thoroughly.
Avoid over-mixing to minimize air entrapment.

While particular formulations have been set forth to
describe and exemplify this invention, such are not intended
10 to be limiting. Rather, it should be noted by those
ordinarily skilled in the art that the within disclosures
are exemplary only and that various other alternative
formulations may be made within the scope of the present
invention. Accordingly, the present invention is not
15 limited to the specific embodiments illustrated herein, but
is limited only by the following claims.

We claim:

1. An anti-icing composition comprising an aqueous solution of monohydroxy and/ or polyhydroxy alcohols thickened with a combination of an acrylic emulsion polymer and a water-swellable, colloid-forming clay mineral.

2. The composition of claim 1 further comprising at least 1 weight percent glycerine.

3. The composition of claim 1 for use in all types of locks.

4. The composition of claim 1, for use in or on moving mechanisms, further comprising Teflon powder as an added ingredient.

5. The composition of claim 1, for use in or on moving mechanisms, comprising graphite as an added ingredient.

6. The composition of claim 1, for use in windshield washer reservoirs of trucks or automobiles.

7. The composition of claim 6, comprising non-toxic freezing point depressants.

8. A composition comprising an anti-icing fluid with an added surfactant combination comprising a first surfactant with an HLB \leq 3 coupled with a second surfactant with an HLB 19.

9. The composition of claim 8 wherein said first surfactant and said second surfactant comprise block copolymers of ethylene-oxide and propylene-oxide.

10. The composition of claim 8 wherein said anti-icing fluid comprises an aqueous solution of monohydroxy and/ or polyhydroxy alcohols.

11. An anti-icing composition comprising an aqueous solution of monohydroxy and/ or polyhydroxy alcohols with a surfactant of HLB \leq 3 added to inhibit water incursion into the composition.

12. The composition of claim 11 wherein said surfactant comprises a block copolymer of ethylene-oxide and propylene-oxide.

13. An anti-icing composition comprising an aqueous solution of polyvinyl alcohol, with one polyol or a combination of polyols added to comprise at least 30 weight percent of the total composition.

14. The composition of claim 13 wherein said polyol or one of said combination of polyols comprises glycerine.

20 15. The composition of claim 13, wherein said aqueous solution of polyvinyl alcohol and said polyol or combination

of polyols are mixed together within a few hours of application.

16. The composition of claim 15, wherein said aqueous solution of polyvinyl alcohol comprises the added ingredient 5 of hydrogen peroxide, and said polyol or combination of polyols comprises the added ingredient of one or more polymeric thickening agents.

ABSTRACT OF THE DISCLOSURE:

Formulations for anti-icing compositions are of two basic types. The first basic formulation describes alcohol/polyol-based aqueous fluids thickened by the 5 combination of an acrylic emulsion and a water-swellable layered clay mineral, with optional addition of a surfactant combination comprised of a first surfactant with an HLB \leq 3 coupled with a second surfactant with an HLB 19, and further optional addition of a water-activated polymer and 10 other components. The second basic formulation describes a polyol-based aqueous solution of polyvinyl alcohol with optional thickeners.

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DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION

Declaration Submitted with Initial Filing Declaration Submitted after Initial Filing

Attorney Docket Number	61311008
First Named Inventor	Andrews, Greg R.
COMPLETE IF KNOWN	
Application Number	
Filing Date	September 14, 2000
Group Art Unit	
Examiner Name	

As a below named inventor, I hereby declare that.

My residence, post office address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Anti-Icing Formulations

(Title of the Invention)

the specification of which

is attached hereto

OR

was filed on (MM/DD/YYYY)

as United States Application Number or PCT International

Application Number

and was amended on (MM/DD/YYYY)

(if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37 Code of Federal Regulations, § 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code §119 (a)-(d) or § 365(b) of any foreign application(s) for patent or inventor's certificate, or §365 (a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or of any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached?
			<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

Additional foreign application numbers are listed on a supplemental priority sheet attached hereto:

I hereby claim the benefit under Title 35, United States Code § 119(e) of any United States provisional application(s) listed below.

Application Number(s)	Filing Date (MM/DD/YYYY)	Additional provisional application numbers are listed on a supplemental priority sheet attached hereto.
60/154,706	09/18/1999	<input type="checkbox"/>

61311008.010

[Page 1 of 3]

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DECLARATION

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s), or §365(c) of any PCT international application designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of Title 35, United States Code §112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations §1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

U.S. Parent Application Number	PCT Parent Number	Parent Filing Date (MM/DD/YYYY)	Parent Patent Number (if applicable)

Additional U.S. or PCT international application numbers are listed on a supplemental priority sheet attached hereto.

As a named inventor, I hereby appoint the following registered practitioner(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

Name	Registration Number	Name	Registration Number
Barry E. Kaplan, Esq.	38,934		

Additional registered practitioner(s) named on a supplemental sheet attached hereto.

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Name of Sole or First Inventor:

A petition has been filed for this unsigned inventor

Given Name	Greg	Middle Initial	R.	Family Name	Andrews	Suffix e.g. Jr.
Inventor's Signature						Date 9/14/00

Residence: City	Middletown	State	CT	Country	United States	Citizenship	U.S.A.
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City	Middletown	State	CT	Zip	06457	Country	United States
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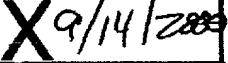
Additional inventors are being named on supplemental sheet(s) attached hereto

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DECLARATION				ADDITIONAL INVENTOR(S) Supplemental Sheet			
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Name of Additional Joint Inventor, if any:				<input type="checkbox"/> A petition has been filed for this unsigned inventor			
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Inventor's Signature					Date		
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Name of Additional Joint Inventor, if any:				<input type="checkbox"/> A petition has been filed for this unsigned inventor			
Given Name		Middle Initial		Family Name			Suffix e.g. Jr.
Inventor's Signature					Date		
Residence: City			State		Country		
Post Office Address							
Post Office Address							
City		State		Zip		Country	
Name of Additional Joint Inventor, if any:				<input type="checkbox"/> A petition has been filed for this unsigned inventor			
Given Name		Middle Initial		Family Name			Suffix e.g. Jr.
Inventor's Signature					Date		
Residence: City			State		Country		
Post Office Address							
Post Office Address							
City		State		Zip		Country	
<input type="checkbox"/> Additional inventors are being named on supplemental sheet(s) attached hereto							